CORONARY CALCIUM IN PATIENTS WITH METABOLIC SYNDROME: PRESENCE AND EXTENT BY MSCT

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Received: 15/2/2023
Accepted:10/3/2023

Online ISSN: 2735-3540

ABSTRACT:

Background: *Obesity, insulin resistance, dyslipidemia, and hypertension are all components of the metabolic syndrome, which is a collection of interconnected cardiovascular risk factors. Because of the increasing prevalence of cardio-metabolic risk factors, the incidence of cardiovascular disease has increased at an unprecedented rate. Coronary arterial calcification (CAC) and the burden of coronary atherosclerosis plaque as well as the emergence of future events are significantly associated.*

Aim of the Work: *To evaluate the effect of metabolic syndrome on presence and extend of coronary calcium by MSCT*

Patients and Methods: *150 subjects who had metabolic syndrome referred for multislice computed tomography (MSCT) coronary angiography at Kobry El-Kobba military hospital between June 2013 and January 2014 were included.*

Results: *Patients with metabolic syndrome had a higher frequency of coronary calcification. An independently significant risk factor for the development and severity of coronary calcification was waist circumference, but not BMI. Low HDL, diabetes, and hypertension were related to the frequency and degree of coronary calcification. High levels of low-density lipoprotein (LDL) and total cholesterol are significantly correlated with coronary calcification. Elevated triglycerides was not related to coronary calcification, either in terms of its occurrence or severity. The frequency and severity of CAC increased with age among male smokers.*

Conclusion: *The presence and level of coronary calcification are closely related to metabolic syndrome, even in asymptomatic people. Coronary calcification is far more likely to occur when the metabolic syndrome's component numbers increase. Patients who meet the criteria for metabolic syndrome even when asymptomatic can prevent excessive radiation exposure with the safe and helpful process of CAC screening.*

Keywords: *Coronary Calcium; Metabolic Syndrome; Coronary artery calcification; MSCT.*

INTRODUCTION:

The complicated illness known as metabolic syndrome (MetS) is seen as an epidemic on a global scale. MetS is characterised by a collection of interrelated characteristics that significantly raise the risk of diabetes mellitus type 2 (DMT2), various cardiovascular atherosclerotic diseases, and coronary heart disease (CHD). Even in asymptomatic subjects, the presence and degree of coronary calcification are intimately correlated to metabolic syndrome. When the component numbers of the metabolic syndrome increase, the likelihood of coronary calcification increases significantly. CAC screening is a reliable and beneficial procedure that avoids a high radiation exposure on patients who match

the criteria for metabolic syndrome even while asymptomatic. It is completely non-invasive and only takes a few minutes[1-3].

For the metabolic syndrome, a number of professional organizations have developed clinical criteria. All groups agreed that obesity, insulin resistance, dyslipidemia, and hypertension are the main components of the metabolic syndrome [4&5].

Increased low-density lipoprotein (LDL), decreased HDL, and elevated blood triglyceride concentrations are the three elements of atherogenic dyslipidemia that can all lead to the development of arterial plaque. The hardening and constriction of the arteries brought on by these plaques might result in a heart attack or stroke[6].

In several epidemiological research, MetS and atherosclerosis have been linked. It is crucial to look at the prevalence of MetS and its elements as well as its connections to subclinical atherosclerosis. Future coronary events and the amount of coronary artery calcium present are both closely related to coronary atherosclerosis plaque burden[7].

Coronary artery disease is a major factor in mortality. It has been demonstrated that unenhanced CT calcium scoring, which may be estimated using the Agatston score[8], as well as additional scores like the volume score[9] or calcium mass[10], is a useful noninvasive method for assessing the risk of impending cardiac events. Large-scale patient studies have demonstrated that, in addition to traditional coronary risk factors, the amount of coronary artery calcium based on the Agatston score is a reliable predictor of the risk of myocardial infarction and sudden cardiac death[11–13].

AIM OF THE WORK:

This study's objective was to use MSCT to determine whether and how much coronary calcium was present in participants who had metabolic syndrome.

Ethical Consideration:

This study was approved by the ethical committee of (Ain Shams university, Faculty of Medicine, cardiology department 3/2013) and an informed written consent was obtained from all patients prior to their inclusion in the study.

PATIENTS AND METHODS:

In this study, 150 individuals (131 men and 19 women) who had metabolic syndrome and referred for MSCT coronary angiography at Kobry El-Kobba military hospital between June 2013 and January 2014 were included. After thorough discussion of the study, all participants provided signed informed permission.

Patients with central obesity (waist circumference ≥94cm for men and ≥80cm for women) and/or BMI more than >30 Plus two of the following were enrolled in the study: Reduced high density lipoprotein cholesterol < 40mg/dl (1.03mmol/l) for males or <50 mg/dl (1.29 mmol/l) for females, raised fasting triglycerides ≥150 mg/dl (1.7mmol/l), raised blood pressure ≥130mmhg systolic or ≥85mmHg diastolic or on therapies of hypertension and raised fasting plasma glucose ≥100mg/dl (5.6mmol/l), or previously diagnosed type 2 DM. The study's exclusion criteria were no central obesity, individuals with established coronary artery disease, the occurrence of irregular heartbeats (AF, extra systole), incapability to hold breath and renal impairment. Prior to the CT angiography procedure, the following tests were administered to all patients: complete clinical examination, history taking.

A multi-slice CT coronary angiography was conducted on the patients to determine: Coronary calcium score: The calcium content of the coronary arteries was assessed using the Agatson scale [10] as follows: There is no illness, 0; mild disease, 1–99; moderate disease, 100–399; and severe disease, 400 or higher. Along with the total calcium score, the following data was gathered: The calcium

volume score represents the number of affected vessels as well as the volume of calcification across the vessels.

Facts from a Coronary Scan:

The presence or absence of any coronary calcium signifies that underlying CAD is present.

The degree/extent of calcification: A "numeric evaluation" of the degree of plaque load is provided by the "calcium score," which is the overall size and density of the calcium deposits seen throughout the coronary arteries. The bigger the "score," the greater the plaque burden and the chance of a future heart attack in both symptomatic and asymptomatic patients[14].

Statistical Analysis:

IBM SPSS version 23 was used. The Chi-square test was applied to compare groups based on qualitative data. The Mann-Whitney test was used to compare two independent groups having non-parametric distributions. With the use of quantitative data and a non-parametric distribution, the Kruskall Wallis test was utilised to compare more than two groups. The correlation between two numerical parameters within the same group was evaluated using Spearman correlation coefficients. A 95% confidence interval was used with a 5% allowable margin of error.

RESULTS:

Table (1): Distribution of the research population's baseline characteristics and risk factors

	No.	**%**
Sex		
Female	19	12.7
Male	131	87.3
Age		
Mean±SD	55.42±9.39	
Range	35 – 79	
Risk factors		
HTN	111	74.0%
DM	76	50.7%
Smoking	101	67.3%
Family history of IHD	72	48.0%
S. Cholesterol		
Mean±SD	222.03±43.63	
Range	143 – 389	
LDL.C		
Mean±SD	142.59±26.82	
Range	87 – 255	
HDL.C		
Mean±SD	42.11±9.22	
Range	27 – 76	
S. Triglycerides		
Mean±SD	198.94±64.40	
Range	119 – 611	
FBG		
Mean±SD	112.30±26.55	
Range	70 – 230	
Waist Circumference		
Mean±SD	99.96±4.49	
Range	94 – 120	
BMI		
Mean±SD	29.90±1.69	
Range	24 – 33	

According to Table 1, 111 patients (74% were hypertensive), 76 were diabetic (50.7%), 101 were smokers (67.3%), and 72 had a family history of IHD (48%). Furthermore, total cholesterol levels varied between 143 and 389 mg/dl. The serum LDL.C levels varied from 87 to 255 mg/dl. The serum HDL.C levels varied from 27 to 76 mg/dl. Triglycerides in the serum varied from 119 to 611mg/dl. The serum FBG concentration varied between 70 and 230 mg/dl. The waist circumference varied from 94 to 120 cm. BMI varied from 24 to 33cm.

Table (2): Prevalence of CAC among the study group:

	No.	**%**
Coronary calcium		
Negative	62	41.3
Positive	88	58.7
Coronary arteries		
LM	11	7.30%
LAD	80	53.30%
LCX	42	28.00%
RCA	49	32.70%
No. of affected vessel		
No-vessel	62	41.30%
One-vessel	22	14.70%
Two-vessels	44	29.30%
Three-vessels	19	12.70%
Four-vessels	3	2.00%

Table 2 demonstrates that the study population had a greater frequency of CAC (58.7%). The prevalence of CAC in coronary arteries is also demonstrated in Table 2. CAC affected the LAD in 80 cases (53.30%), followed by the RCA in 49 cases (32.70%) and LCX in 42 patients (28%). Finally, in 11 cases (7.30%), LM was the least impacted vessel by CAC. In terms of affected vessels, two vessel disease had the greatest rate of CAC (29.3%).

Table (3): CAC score classification according to Agatson scale:

Calcium groups	**No. of patients**	**%**
No CAC (CAC=0)	62	41.3
Mild(CAC=1-99)	47	31.3
Moderate(CAC=100-399)	34	22.7
Severe(CAC>400)	7	4.7
Total	150	100

Table 3 reveals that the calcium score was classified according to the Agatson scale as follows: CAC =0 was discovered in 62 cases (41.3%), (CAC=1-99) mild group was found in 47 cases (31.3%), and (CAC=100-399) severe group was identified in 62 cases (41.3%). The intermediate group was discovered in 34 instances (22.7%), while the severe group (CAC>400) was detected in 7 cases (4.7%).

Table (4): Coronary calcium and the metabolic syndrome criteria as stated by the IDF:

		No coronary calcium		Coronary calcium		Chi-square test	
		No.	%	No.	%	X^2	P-value
HTN	-ve	23	37.10%	16	18.20%	6.764	0.009
	+ve	39	62.90%	72	81.80%		
DM	-ve	43	69.40%	31	35.20%	16.948	0.000
	+ve	19	30.60%	57	64.80%		
HDL	> 40 mg/dl M >50mg/dl F	45	72.60%	37	42.00%	13.685	0.000
	< 40mg/dl M <50 mg/dl F	17	27.40%	51	58.00%		
Triglyceride	< 150mg/dl	9	14.50%	20	22.70%	1.572	0.210
	> 150mg/dl	53	85.50%	68	77.30%		
Waist circumference	94-102 cm M 80-88cm F	61	98.4%	32	36.4%	59.391	0.000
	>102cm M >88cm F	1	1.6%	56	63.6%		

Table 4 illustrates the association between coronary calcium and the metabolic syndrome criteria. HTN and CAC were shown to be significantly correlated (P=0.009). A strong relationship between the presence of CAC and DM, HDL.C, and a big waist circumference was seen (p=0.000). It was shown that there was no association between the presence of CAC and S. triglyceride levels (p=0.210).

Table (5): Association between HTN, DM, HDL.C, S. Triglyceride, levels and extent of CAC:

		Negative No.=62		Mild No.=47		Moderate No.=34		Severe No.=7		Chi-square test	
		No.	%	No.	%	No.	%	No.	%	X^2	P-value
HTN	No	23	37.1%	10	21.3%	6	17.6%	0	0.0%	8.206	0.042
	Yes	39	62.9%	37	78.7%	28	82.4%	7	100.0%		
	Total	62	100%	47	100%	34	100%	7	100%		
DM	No	43	69.4%	16	34.0%	15	44.1%	0	0.0%	21.525	0.000
	Yes	19	30.6%	31	66.0%	19	55.9%	7	100.0%		
	Total	62	100%	47	100%	34	100%	7	100%		
HDL.C	>40mg/dl M >50mg/dl F	45	72.60%	24	51.1%	12	35.3%	1	14.30	18.029	0.000
	< 40mg/dl M <50mg/dl F	17	27.40%	23	48.90%	22	64.70%	6	85.70%		
	Total	62	100%	47	100%	34	100%	7	100%		
Triglyceride	< 150 mg/dl	9	14.50%	11	23.4%	8	23.5%	1	14.30%	1.920	0.589
	> 150 mg/dl	53	85.50%	36	76.60%	26	76.50%	6	85.70%		
	Total	62	100%	47	100%	34	100%	7	100%		
Waist circumference	94-102 cm M 80-88 cm F	61	98.40%	27	57.4%	4	11.8%	1	14.30%	78.439	0.000
	>102 cm M >88cm F	1	1.60%	20	42.6%	30	88.2%	6	85.70%		
	Total	62	100%	47	100%	34	100%	7	100%		

Table 5 demonstrates that 39 (62.9%) of HTN patients had no CAC, 37 (78.7%) had mild detectable CAC, 28 (82.4%) had moderate CAC, and 7 (100%) had CAC >400 (p=0.042). Furthermore, 19 (30.6%) of DM patients exhibited no CAC. 31 (66%) had mild CAC, 19 (55.9%) had moderate CAC, and 7 (100%) had severe CAC, indicating that diabetes was substantially linked with the amount of CAC (p=0.000).

Table 5 further reveals that 17 (27.4%) of the study population had low HDL. C (40mg/dl for men and 50mg/dl for females) had no CAC, 23 (48.9%) had mild detectable CAC, 22 (64.7%) had moderate CAC, and 6 (85.7%) had severe CAC, resulting in lower HDL. C was related to a higher CAC score (p=0.000).

Regarding high TG, 53 (85.5%) had no CAC, 36 (76.6%) had mild detectable CAC, 26 (76.5%) had moderate CAC, and 6 (85.7%) had CAC >400, indicating that the amount of CAC has no relationship (p = 0.589) (Table 5).

Table 5 also demonstrates a statistically significant relationship between the degree of CAC score and increasing waist circumference (p = 0.000).

Table (6): Relationship between No. of metabolic risk factors and total Agatson score:

		Agatson Total calcium score		**Kruskall-Wallis test**	
		Median	**IQR**	**K**	**P-value**
No .of metabolic risk factors	Three risks	10	0 – 47	43.397	0.000
	Four risks	78	0 – 154		
	Five risks	218	120 – 1002		

Table 6 reveals that the median CAC score with three metabolic risk factors was 10. The median CAC score rises to 78 when four metabolic risk factors are present. The median CAC score rises to 218 when five metabolic risk factors are present. This indicates that as the number of metabolic components increases, so does the overall Agatson score p=0.000.

Table (7): Relationship between the quantity of metabolic components and the number of damaged vessels:

No. affected vessel	Three metabolic risks		Four metabolic risks		Five metabolic risks		Chi-square test	
	No.	%	No.	%	No.	%	X^2	P-value
No vessels affected	46	59.70%	16	27.60%	0	0.00%	47.648	0.000
One vessel	12	15.60%	10	17.20%	0	0.00%		
Two vessels	13	16.90%	24	41.40%	7	46.70%		
Three vessels	6	7.80%	7	12.10%	6	40.00%		
Four vessels	0	0.00%	1	1.70%	2	13.30%		
Total	77	100.00%	58	100.00%	15	100.00%		

Table 7 shows that the number of coronary arteries affected rises along with the quantity of metabolic components (p=0.000).

Table (8): Relationship between CAC score and other non- metabolic risk factors (qualitative factors):

		Agatson Total calcium score		Mann-Whitney test	
		Median	IQR	Z	P-value
Sex	Female	0	0 – 0	3.438	0.001
	Male	41	0 – 110		
Smoking	Negative	0	0 – 77	2.621	0.009
	Positive	37	0 – 110		
Family history of IHD	Negative	23	0 – 100	1.005	0.315
	Positive	31	0 – 115		

Male sex, smoking, and total Agatson score are significantly correlated, as shown in Table 8 (p = 0.001, p = 0.009). There was no correlation between the total Agatson score and IHD family history (p = 0.315).

Table (9): Relationship between CAC score and laboratory risk factors for atherosclerosis (quantitative factors):

	Agatson Total calcium score	
	r	**p-value**
S. Cholesterol	0.353**	0.000
LDL	0.224**	0.006
FBG	0.311**	0.000
BMI	0.091	0.268

Table 9 demonstrates that CAC score has a significant relationship with total cholesterol (p=0.000), LDL (p=0.0006), and FBG (p=0.000). CAC score and BMI had no significant connection (p= 0.268).

DISCUSSION:

The current study investigated the relationship between IDF-defined metabolic syndrome components and the occurrence and severity of coronary calcification in asymptomatic individuals.

According to the current study, the prevalence of coronary artery calcification increased among people with metabolic syndrome.

Numerous studies have established a link between MetS and CAC. According to Mahoney et al., metabolic syndrome indicators in children, such as larger waist circumference, lower HDL, and higher blood pressure, predict increased coronary calcification in young patients[15].

According to Santos et al., the prevalence of CAC rose with the number of metabolic syndrome components among Brazilian intermediate risk persons (none = 29%, 1 or 2=44%, and ≥3=51%, P=0.002 for trend)[16].

This study revealed that central obesity, as defined by higher waist circumference, was associated with the presence and extent of coronary calcium (p=0.000), but not with BMI (p=0.306).

Our results supported the St Francis Heart Study's conclusion that the prevalence of CAC in 50–70-year-old men and women in the United States was correlated with abdominal obesity as determined by waist circumference[17].

Many cross-sectional research looked at the relationship between obesity and CAC scores. Higher waist circumference and waist to hip ratio were linked to CAC in 2951 African-American and white young people in the Coronary Artery Risk Development in Young Adults research [18&19].

To determine whether BMI or WC is a better predictor of atherosclerosis, several research were conducted[20]. Lean et al. used WC as a method to analyse approximately 2200 individuals to ascertain their atherosclerosis risk. They found that waist circumference was a better predictor of myocardial events and had a greater connection with atherosclerosis than waist-hip ratio. Additionally, he found that WC had a stronger correlation with CHD risk factors than BMI did[21].

In the Dallas Heart Study, which included 2744 participants, the waist to hip ratio demonstrated greater distinction of CAC than BMI or waist circumference, in contrast to prior findings[22].

In this investigation, there was a significant correlation between coronary calcium levels and HTN, with p values of 0.009 and 0.042, respectively.

The specific processes underlying the connections between coronary atherosclerosis, calcification, and hypertension are difficult to identify. Hypertension may facilitate the atherogenic process by escalating arterial wall stress brought on by an increase in arterial pressure and/or certain concomitant shearing circumstances. Our findings on HTN are supported by two prior studies[23&24] that found a history of hypertension was independently related with the possibility of detectable coronary calcium assessed by ultrafast CT in at-risk persons without symptoms. Another study found a significant association between increasing systolic blood pressure throughout adolescence and the onset of coronary calcification as detected by ultrafast CT[25].

Our study showed independent relation between coronary calcium score and diabetes (p=0.000).

Diabetes patients scored higher on the calcium test than non-diabetics, according to Hoff et al.[26].

Additionally, Schurgin et al. found that compared to matched control volunteers (14%), diabetic patients (26%) had a higher percentage of CAC scores >400 (indicating severe illness) (P = 0.004)[27]. Extensive CAC was substantially more common in type 2 diabetics (27%) compared to non-diabetics (8%), according to recent research by Wagenknecht et al.[28].

According to the results of the current investigation, blood HDL cholesterol was substantially linked with both the existence and severity of CAC (p=0.000). Similar findings were made by the Pathobiological Determinants of Atherosclerosis in Youth (PDAY) study[29], which found a significant correlation between low HDL cholesterol levels and the size and severity of atherosclerotic lesions in the right coronary artery and aorta in adolescents and young adults aged 15 to 34. Low HDL cholesterol was also consistently one of the risk variables most strongly linked to the development of coronary artery calcification in young persons in the prospective Muscatine trial[30].

It is interesting that, with p values of 0.000 and 0.006, respectively, an increase in coronary calcium score was linked to both total cholesterol and LDL cholesterol.

930 asymptomatic patients who underwent coronary electron beam computed tomography at the Arizona Heart Institute were the subjects of a related study by Hecht et al. They discovered that those with calcified coronary plaque had lower levels of HDL cholesterol and greater levels of total and LDL cholesterol. This supports what we found[31].

In this study, there was no correlation between serum TG and the quantity or presence of coronary calcium (p = 0.210 and p=0.589, respectively).

The origins of the association between triglycerides and coronary atherosclerosis require more investigation, particularly into the inherited susceptibility of dyslipidemic individuals[32]. Numerous evidence indicate a genetic component in those with early CHD and unusually high blood triglyceride levels[33&34].

Even while the majority of population-based cohort studies have discovered a univariable link between triglyceride levels and CAD, the correlation weakens or disappears when total and/or HDL cholesterol levels are taken into account. This is because there is a lot of physiological intra- and inter-individual variability, which makes it difficult to evaluate triglyceride levels. Second, there are significant interactions between triglycerides and other lipid factors. Reduced HDL levels usually accompany elevated triglycerides, and this combination has been related to a higher risk of CHD[35].

In contrast to our findings, an earlier study including 374 people found a strong

connection between raised CAC and increased TG[36].

Additionally, CAC was substantially greater in men than in women (p=0.001) and increased with age (p=0.000).

The degree of cardiac calcification is greatly influenced by age and gender. Because CAC rises with age, some people think that calcification is just a marker of ageing. However, a Brazilian research discovered a positive link between age, male sex, and coronary calcium score (r = 0.4, p 0.01)[37].

Family history and CAC were not correlated in our study (p=0.315). Budoff et al. found that CAC may predict all cause death, regardless of family history of early CAD, in the biggest research to date that looked at the influence of several risk variables on CAC outcomes[38].

However, a confirmed family history of CAD was related to a twofold rise in CAC findings in the Framingham study sample[39]. Smoking was significantly correlated to CAC, according to our research (p=0.009). Our findings are in line with other studies that have repeatedly shown a strong and obvious link between smoking and atherosclerotic disease in both younger and older people[40&41].

Conclusion:

Even in those who are asymptomatic, metabolic syndrome is highly associated with the prevalence and severity of coronary calcification. The prevalence of coronary calcification significantly increases as the number of metabolic syndrome components increase. CAC screening is a trustworthy and beneficial modality as a fully non-invasive and fairly time-efficient screening strategy, even in circumstances when the patient is asymptomatic and satisfies the criteria for the metabolic syndrome.

Financial support and sponsorship:

Nil.

Conflicts of interest:

We have no conflicts of interest to disclose.

Author's Contribution

H M F, K M A selected the patients and reviewed their images and did the interventional procedure, collected, tabulated, and analyzed the data

M I A, M A A, supervised management of the cases, interpreted the patient data and wrote the manuscript.

All authors read and approved the final manuscript.

Abbreviations

CAC: Coronary arterial calcification
CHD: Coronary heart disease
DMT2: Diabetes mellitus type 2
HDL: High-density lipoprotein
LDL: Low-density lipoprotein
MetS: Metabolic syndrome
MSCT: Multislice computed tomography

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حدوث ومدى امتداد الكالسيوم فى الشرايين التاجية فى المرضى الذين يعانون من متلازمة التمثيل الغذائى بإستخدام الاشعة متعددة المقاطع

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الخلفية: السمنة ، ومقاومة الأنسولين ، اضطراب شحميات الدم ، وارتفاع ضغط الدم كلها مكونات من متلازمة التمثيل الغذائي ، وهي مجموعة من عوامل الخطر التى تزيد معدل الاصابة بأمراض القلب التاجية. بسبب الانتشار المتزايد لمتلازمة التمثيل الغذائى، فقد زاد معدل الإصابة بأمراض القلب والأوعية الدموية بمعدل غير مسبوق. يرتبط بشكل كبير تكلس الشرايين التاجية وبنسبة تصلب الشرايين التاجية وكذلك ظهور أمراض القلب فى المستقبل.

المرضى والطرق: تم تضمين ١٥٠ شخصًا ممن يعانون من متلازمة التمثيل الغذائي المحولين إلى تصوير الأوعية التاجية بالتصوير المقطعي متعدد الشرائح في مستشفى كوبري القبة العسكري بين يونيو ٢٠١٣ ويناير ٢٠١٤.

النتائج: المرضى الذين يعانون من متلازمة التمثيل الغذائي لديهم نسبة أعلى من تكلس الشريان التاجي. كان أحد عوامل الخطر الهامة بشكل مستقل لتطور وشدة تكلس الشريان التاجي محيط الخصر ، ولكن ليس مؤشر كتلة الجسم. ارتبط انخفاض البروتين الدهني عالي الكثافة والسكري وارتفاع ضغط الدم بتكرار ودرجة تكلس الشريان التاجي. ترتبط المستويات العالية من البروتين الدهني منخفض الكثافة والكوليسترول الكلي ارتباطًا وثيقًا بتكلس الشريان التاجي. لم يكن لارتفاع الدهون الثلاثية علاقة بتكلس الشريان التاجي ، سواء من حيث حدوثه أو شدته. تزداد وتيرة وشدة تكلس الشرايين التاجية مع تقدم العمر بين الذكور المدخنين.

الخلاصة: إن وجود ومستوى تكلس الشريان التاجي مرتبطان ارتباطًا وثيقًا بمتلازمة التمثيل الغذائي ، حتى في الأشخاص الذين لا يعانون من أعراض. من المرجح أن يحدث تكلس الشريان التاجي عندما تزداد أعداد مكونات متلازمة التمثيل الغذائي. يمكن للمرضى الذين يستوفون معايير متلازمة التمثيل الغذائي حتى عندما لا تظهر عليهم أعراض أن يمنعوا التعرض المفرط للإشعاع من خلال عملية فحص تكلس الشرايين التاجية الآمنة والمفيدة.